What is an ‘Indian summer’?

Description

After a warm, dry, sunny summer, the fine weather is continuing this week with temperature expected to reach 28 to 29 °C in the southeast on Wednesday and Thursday.

Many media reports are calling this an ‘Indian summer’, however according to the Met Office’s Meteorological Glossary, it’s a little too early in the year. An Indian summer is defined as a warm, calm spell of weather occurring after the first frost in autumn, especially in October and November.

William R Deedler, Weather Historian at the United States National Weather Service, describes it as “any spell of warm, quiet, hazy weather that may occur in October or even early November”.

The origins of the term Indian summer are uncertain, but several writers suggest it may be have been based on the warm, hazy conditions in autumn when native American Indians chose to hunt. The earliest record of the use of the term is in America at the end of the 18th century. Although William R Deedler also refers to a reference by a French man, John de Crevecoeur, in 1778:

“Sometimes the rain is followed by an interval of calm and warmth which is called the Indian Summer; its characteristics are a tranquil atmosphere and general smokiness. Up to this epoch the approaches of winter are doubtful; it arrives about the middle of November, although snows and brief freezes often occur long before that date.”

The term was first used in the British Isles at the beginning of the 19th century, but there is no statistical evidence to show that such a warm spell tends to recur each year. The warmest recorded temperatures in the UK in October and November are 29.9 °C on 1 October 2011, in Kent, and 21.1 °C on 2 November 1938, in Essex and Suffolk.

For the latest weather forecast go to www.metoffice.gov.uk/weather

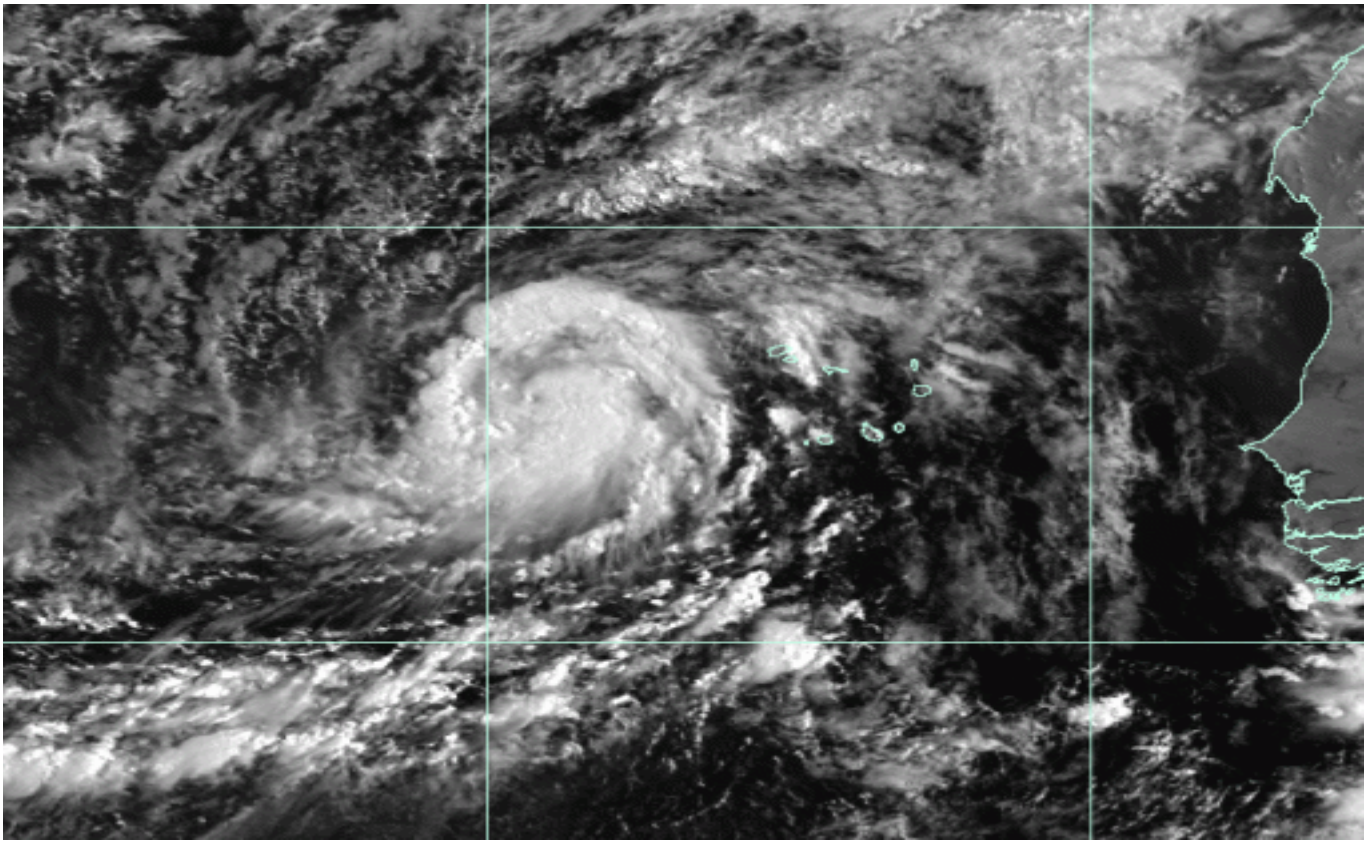
Date Created
September 2013

Humberto is the first hurricane in a quiet season so far

Description

The Atlantic hurricane season is usually reaching its peak during the first half of September, but so far the season has been very quiet.

Humberto has just become the first hurricane of the Atlantic season. In the last 70 years only one season has seen the first hurricane form later.



There are various ways of measuring tropical storm activity including the number of storms, the number of hurricanes and something called the Accumulated Cyclone Energy (ACE) Index. The latter measure takes into account both the strength and duration of storms and so gives a good indication of how active a season it has been. Whilst there have been eight tropical storms in the Atlantic so far, many have been weak and short-lived and thus the ACE Index is only running at 27% of where it would be in an average season at this time in the year.

It is not only the Atlantic which is seeing low levels of tropical storm activity. ACE Index across the whole northern hemisphere is running at 42% of average for this point in the season. There have only been two major typhoons in the west Pacific, which is an unusually low number.

It is worth noting that a quiet start to the Atlantic season does not necessarily mean the season will

remain quiet. For example, in 2001 there had only been five tropical storms to this point in the season with just one becoming a hurricane. However, the remainder of the season saw another 10 tropical storms of which eight became hurricanes.

Official forecasts of current Atlantic tropical storms are provided by the National Hurricane Center. Visit our tropical cyclone pages for more information or follow @metofficestorms on Twitter.

Date Created
September 2013

August weather summary

Description

Overall August saw quiet weather, with temperatures close to average. Forecaster Helen talks through the weather we saw in August in our summary video.

A maximum temperature of 34.1 °C was recorded at Heathrow on the 1st, the highest UK temperature since July 2006. A minimum temperature of 0.2 °C was recorded at Kinbrace (Sutherland) on the 5th. In the 24 hours ending at 0900 GMT on the 5th, 61.0 mm of rain fell at Porthmadog (Gwynedd). A wind gusts of 68 mph was recorded at Needles Old Battery (Isle of Wight) on the 17th. Visit our climate section for a full written summary of the month.

Your pictures

Thank you for sharing your pictures of August weather with us on Twitter, here's a few of our favourites…

> @metoffice Fluffy tails & fluffy clouds photographed on 'The Cheviot' Northumberland. pic.twitter.com/p3iS9kWS7F
>
> — Ian Cook Photography (@iancook57) September 10, 2013

> @metoffice pic.twitter.com/9ewLIpKfPM
>
> — Kristian Stentoft (@Kstentoft) September 10, 2013

> @metoffice #LoveUkWeather #sunset in #TheNewForest pic.twitter.com/ppqmvhXoMZ
>
> — DizzyChick (@youngonesfive) September 10, 2013

> @metoffice Bamburgh Castle Northumberland, on a warm sunny evening. pic.twitter.com/oKkml9I8TA
>
> — Ian Cook Photography (@iancook57) September 10, 2013

> @metoffice Another one of Chesil Beach! pic.twitter.com/kNYvV05l5Z
>
> — Dream Cottages (@DreamCottages) September 10, 2013

Date Created
September 2013

Is Arctic sea ice shrinking or expanding?

Description

The decline of Arctic sea ice is often pointed to as one of the most visible indicators of a warming world but earlier this week the Mail on Sunday published an article claiming the ice is in recovery. This was followed by similar stories in The Express and The Telegraph.

However, yesterday there were stories on BBC online and CBS News, among others, saying satellite evidence confirms the ongoing story of long-term decline. So what's really going on?

Year to year variability

Arctic summer sea ice extent has a lot of year to year variability because it can be heavily influenced by weather patterns:

– temperatures naturally vary from one year to the next;
– the amount of cloud can affect the amount of surface melting;
– summer storms can also break up ice, which can accelerate the melting process;
– settled conditions can be more conducive to ice forming;
– winds may act to spread out the ice or push it together.

Due to this high degree of variability, it's important to look past short term fluctuations in sea ice extent and look at the longer records.

Also sea ice extent is only one part of the story; it's the volume of sea ice that we should also be considering that depends on ice thickness as well as extent.

The longer-term view

Satellites provide the most comprehensive measurements of sea ice extent, and have provided data since 1979. They show a long-term trend of decline in sea ice extent, at an annual rate of more than 4% per decade.

The seasonal minimum (September) ice extent has declined at the faster rate of 11% per decade, and this rate of decline has accelerated in the past 15 years.

More importantly the volume of sea ice has declined substantially since 1979, as the ice has thinned. This has made the ice much more vulnerable to stormy weather, as was the case in 2012.

How does this fit the news stories?

The Mail on Sunday article points to a big recovery in Arctic sea ice compared to last year, but this needs to be viewed in context.

Last year's minimum sea ice extent was 3.41 million square kilometres according to the US National

Snow and Ice Data Center (NSIDC), 0.76 million square kilometres lower than the previous record set in 2007.

Extent has not yet reached its minimum for 2013, so it's too early to make any definitive judgements. However, using NSIDC data to August this year we know that while the ice cover was greater than at the same time last year, it was still ranked as the sixth lowest August extent in the 34-year record.

Ann Keen, Sea Ice Scientist at the Met Office, said: "In 2012 we saw a record low which was likely to have been influenced by a storm which swept through the region in summer, but this year's weather conditions appear to have been less conducive to ice loss.

"We know sea ice extent is going to vary from year to year due to weather conditions and that's not at all inconsistent with the overall decline in extent. You wouldn't expect to see records broken year after year, so this 'recovery' is not unexpected.

"In fact, model simulations of sea ice suggest that a as the ice gets thinner you actually get more year to year variability in extent because larger areas of the ice are more vulnerable to melting away completely over the summer."

The stories published yesterday use new data from a satellite named CryoSat which looks at sea ice volume, which gives a better view of the relative 'health' of the sea ice.

Data from this satellite shows that the ice continues to thin and the volume of sea ice continues to shrink.

So all the evidence suggests the long-term decline of Arctic sea ice continues.

Date Created
September 2013

Met Office in the Mail on Sunday

Description

An article appears in the Mail on Sunday today focusing on the Intergovernmental Panel on Climate Change's (IPCC) forthcoming Fifth Assessment Report (AR5) which it bills this as the 'world's most authoritative climate study'.

It's fair to say that AR5 is expected to be the most comprehensive review of climate change science to date. The first part of the report, from its Working Group I (WGI), has been worked on by more than 800 scientists from around the world who have assessed more than 9,000 scientific publications and taken into account more than 50,000 comments from over 1000 expert reviewers.

The WGI report is now in its final stages and the major conclusions will be finalised and released on 27 September. It is at that point that we should debate its findings and their implications.

Further parts of the report, from its Working Group II and III, as well as a final version of the whole report will be published next year.

The Mail article also discusses the recent pause in warming, which the Met Office looked at in a series of papers, released in July. Many of the issues raised in the article are addressed in those reports, which you can see on our website.

The article also goes on to mention some of the claims made in a commentary published by Nic Lewis yesterday. This is a lengthy and technical commentary covering several topics and will require time to provide as helpful a response as possible, so further comment will be released in due course.

There are a couple of points raised in the Mail story which should be addressed now, however.

The article states that the Met Office's 'flagship' model (referring to our Earth System Model known as HadGEM2-ES) is too sensitive to greenhouse gases and therefore overestimates the possible temperature changes we may see by 2100.

There is no scientific evidence to support this claim. It is indeed the case that HadGEM2-ES is among the most sensitive models used by the IPCC (something the Met Office itself has discussed in a science paper published early this year), but it lies within the accepted range of climate sensitivity highlighted by the IPCC.

Equally when HadGEM2-ES is evaluated against many aspects of the observed climate, including those that are critical for determining the climate sensitivity, it has proved to be amongst the most skilful models in the world.

Finally, in our aim to provide the best possible scientific advice to the UK Government, the Met Office draws on all the scientific evidence available to us. This includes many other physically based climate models from leading research centres around the world, which provide a range of climate sensitivities and a range of potential future warming.

Date Created
September 2013

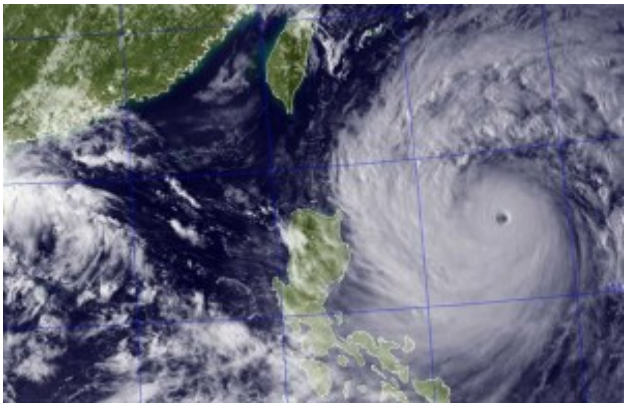
Tropical Cyclones Batter Mexico and China

Description

September is usually the most active month of the year for tropical cyclones and the last week has seen several destructive storms develop.

Mexico came under attack last week on both its Gulf and Pacific coastlines from Hurricanes Ingrid and Manuel. Ingrid came ashore north of Tampico on the Gulf coast bringing heavy rain. However, it was Manuel which caused the greater problems. It made its first landfall as a tropical storm on the Pacific coast of Mexico producing 569mm (22.4”) rain in 24 hours at Chilpancingo in the Sierra Madre del Sur mountains. This resulted in severe flooding in the region of Acapulco. Manuel then re-emerged over sea and strengthened into a hurricane before making a second landfall further up the coast near the mouth of the Gulf of California bringing further heavy rain and flooding.

Meanwhile across the other side of the Pacific Ocean Typhoon Usagi became the strongest tropical cyclone worldwide for almost a year. The typhoon’s central pressure dropped to an estimated 910 mb and the winds averaged over 1-minute were estimated to be of the order of 160 mph. The eye of Usagi passed between Taiwan and the Philippines producing as much as 700 mm of rainfall in the highlands of Taiwan. Usagi continued its track westwards finally making landfall on Sunday over the Guangdong province of China. Hong Kong was spared a direct hit, but still experienced strong winds and heavy rain.



Satellite image of Typhoon Usagi Source Naval Research Laboratory.

The latest storm in the Pacific is named Pabuk and has recently passed close to the Japanese island of Iwo To with winds of 85 mph having been recorded. The storm is moving north, but is expected to turn east before reaching Japan. Thus a direct landfall is not expected. However, Pacific tropical storm activity is expected to continue with the formation of another storm later this week in the South China Sea.

Official forecasts of Atlantic and east Pacific tropical storms are provided by the National Hurricane Center. Official warnings of west Pacific tropical storms are produced by the Japanese Meteological Agency (JMA). For more information on tropical cyclones worldwide visit our web pages or follow @metofficestorms on Twitter.

Date Created
September 2013

Climate science in the media in the run-up to AR5

Description

The past few days have seen a big increase in media coverage of climate science as the world awaits the release of the IPCC's AR5 WGI report at the end of this week.

Media stories have focused on a wide range of issues, with some looking at Arctic sea ice and others claiming that climate models exaggerate the rate of future warming.

In fact it has just been announced that this year Arctic sea ice reached its sixth lowest minimum extent since satellite records began in 1979 and all those years have occurred in the last decade. The long-term decline of Arctic sea ice is one of the most visible of many different signs that our world is warming – a point which few people dispute.

It is also well-established that if we increase concentrations of greenhouse gasses in the atmosphere, then global temperatures will rise. The debate is about how much the world will warm, where it will warm fastest and what the implications are for us.

Today an article by the GWPF think-tank looks at one element of this – the UK's official climate projections, known as UKCP09, which were produced by the Met Office.

It claims the Met Office climate model used to make those projections, HadCM3, contains an error and that, because of this error, the projections overestimate warming. The GWPF's article, however, accepts that the claims of an error have not been substantiated.

UKCP09 used a sophisticated method that used both model projections and observations to provide a range of potential future warming which attempts to take in the uncertainties in model parameters. The GWPF article fails to note that UKCP09 also used information from many other climate models, and that the projections were independently reviewed prior to publication.

Ultimately there is nothing in the GWPF article which undermines UKCP09 or the way climate models, including the Met Office's HadCM3, project future temperature changes.

Date Created
September 2013

Arctic sea ice reaches minimum extent for 2013

Description

Arctic sea ice has been in the media quite a bit this month and we looked at the issue in a blog a couple of weeks ago.

Late last week there was an update to the continuing story, as the National Snow and Ice Data Center (NSIDC) in the US announced that Arctic sea ice extent had reached its summer minimum.

Figures from the NSIDC show this year extent fell to 5.10 million square kilometres on 13 September, and the ice cover is now increasing as we head into the northern hemisphere winter.

It's possible that a shift in wind patterns or a late season melt could push ice extent lower, but – assuming the current figure remains – this year's minimum extent is the sixth smallest since satellite records began in late 1970s.

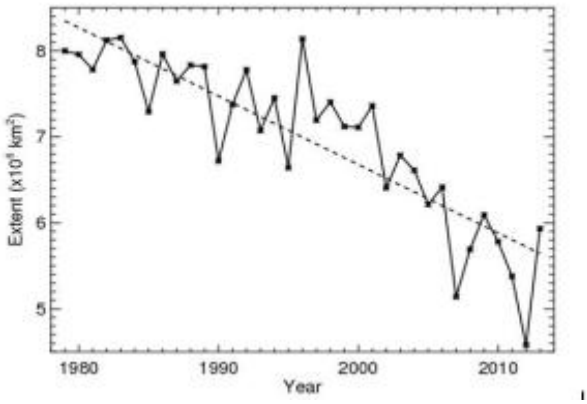
The five lower seasonal minimum ice extents all happened from 2007 onwards, with the record set last year. That record low was just 3.41 million square kilometres, a notably low figure that was likely to have been influenced by weather conditions over the region which accelerated ice loss.

While a detailed analysis is required to understand the exact causes of the seasonal minimum this year, the weather conditions during the summer have been less conducive to ice loss than those experienced last year.

From late May to late June a stream of storms entered the Arctic Ocean, creating cloudy conditions at the time when the sun was at its strongest.

Relatively high ice cover during June and July (compared to recent years) was likely to have delayed the warming of the upper ocean and reduced melting at the base of the ice towards the end of the melt season.

We do expect a year to year variability in sea ice extent precisely because it can be so heavily influenced by weather patterns, but there is a long-term picture of decline – as you can see in the graph of August ice extents below.



August Arctic sea ice extent

New ice thickness data from the Cryosat satellite has also been released recently, and this shows a continuing shrinkage of winter ice volume. This provides a timely reminder that despite the modest recovery in seasonal minimum ice extent this year, the ice continues to thin and the volume of sea ice continues to shrink.

Date Created
September 2013

Should climate models have predicted the pause?

Description

Media coverage today of the launch of the 5th Assessment Report of the IPCC has again said that global warming is “unequivocal” and that the pause in warming over the past 15 years is too short to reflect long-term trends.

Over recent days some commentators have criticised climate models for not predicting the pause. It’s good to see this being addressed, and so begin to clarify the difference between climate model projections and predictions.

We should not confuse climate prediction with climate change projection. Climate prediction is about saying what the state of the climate will be in the next few years, and it depends absolutely on knowing what the state of the climate is today. And that requires a vast number of high quality observations, of the atmosphere and especially of the ocean.

Whilst the last decade has seen a rapid increase in good observations of the surface and upper ocean, thanks to Argo floats, we have very few for the deep ocean. Without these requisite observations to *initialise*, i.e. set running, a climate prediction, it is impossible to have predicted the current pause, however good the climate models.

On the other hand, climate change projections are concerned with the long view; the impact of the large and powerful influences on our climate, such as greenhouse gases. Projections capture the role of these overwhelming influences on climate and its variability, rather than predict the current state of the variability itself.

The IPCC model simulations are projections and not predictions; in other words the models do not start from the state of the climate system today or even 10 years ago. There is no mileage in a story about models being ‘flawed’ because they did not predict the pause; it’s merely a misunderstanding of the science and the difference between a prediction and a projection.

As the IPCC states in line with our three papers on the pause, the deep ocean is likely a key player in the current pause, effectively ‘hiding’ heat from the surface. Climate model projections simulate such pauses, a few every hundred years lasting a decade or more; and they replicate the influence of the modes of natural climate variability, like the Pacific Decadal Oscillation (PDO) that we think is at the centre of the current pause.

The Daily Telegraph today also covers the science of the pause.

Critically there is ever more confidence that the world is warming as a result of human actions, and limiting climate change would require substantial and sustained reductions in emissions of carbon dioxide (CO2) and other greenhouse gases.

Date Created
September 2013